

Appl. No. 09/663,576
 Atty. Docket No. 7882X
 Amdt. Dated June 29, 2004
 Reply to Office Action of April 15, 2004
 Customer No. 27752

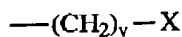
AMENDMENTS TO THE CLAIMS

1. (currently amended) An ether-capped poly(oxyalkylated) alcohol having the formula:



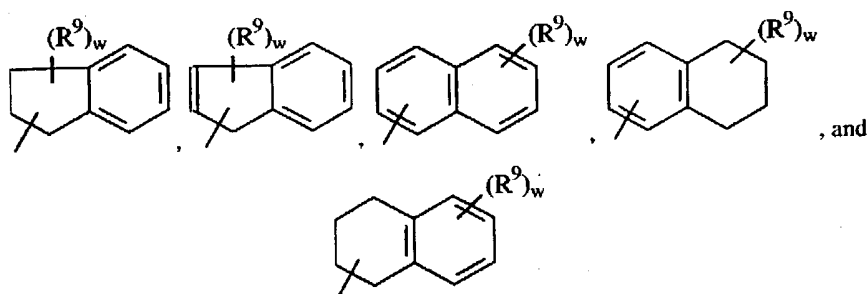
wherein, R is selected from the group consisting of linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic or aromatic hydrocarbon radicals having from about 1 to about 30 carbon atoms; R¹ may be the same or different, and is independently selected from the group consisting of branched or linear C₂ to C₇ alkylene in any given molecule; R² is selected from the group consisting of:

- (i) a 4 to 8 membered substituted, or unsubstituted heterocyclic ring containing from 1 to 3 hetero atoms;
- (ii) a 7 to 13 membered substituted, or unsubstituted polycyclic ring;
- (iii) a hydrocarbon of the formula:



wherein, y is an integer from 1 to 7, X is selected from the group consisting of:

- (A) a 4 to 8 membered substituted, or unsubstituted, partially unsaturated cyclic hydrocarbon radical;
- (B) a 4, 5, 7 or 8 membered substituted or unsubstituted aromatic hydrocarbon radical;
- (C) a 6 membered aromatic hydrocarbon radical wherein R is a linear or branched saturated or unsaturated, C₉ to C₂₀ aliphatic hydrocarbon radical;
- (D) an aromatic hydrocarbon selected from the group consisting of:



wherein each R⁹ is independently selected from the group consisting of hydrogen, linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic hydrocarbon or alkoxy radical having from about 1 to about 10 carbon atoms, ~~a saturated or unsaturated, substituted or unsubstituted, alicyclic or aromatic hydrocarbon radical having from about 3 to about 10 carbon atoms, which is fused to the ring;~~ w is an integer from 1 to 3; and

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(iv) a hydrocarbon radical of the formula:

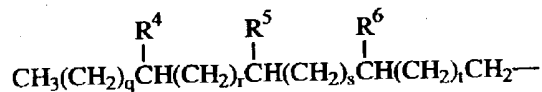


wherein R^3 is selected from the group consisting of:

- (A) linear or branched, saturated or unsaturated, aliphatic hydrocarbon radical having from about 2 to about 30 carbon atoms;
- (B) methyl, wherein R is branched saturated or unsaturated, aliphatic hydrocarbon radical having from 1 to 4 carbon atoms;
- (C) a substituted or unsubstituted aromatic hydrocarbon radical having from about 15 to about 30 carbon atoms;

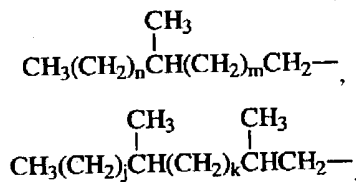
wherein x is a number from 1 to about 30.

2. (original) The compound as claimed in Claim 1 wherein R is a linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic hydrocarbon radical having from about 1 to about 20 carbon atoms.
3. (original) The compound as claimed in Claim 2 wherein R is a linear or branched, saturated, aliphatic hydrocarbon radicals having from about 4 to about 18 carbon atoms.
4. (original) The compound as claimed in Claim 1 wherein R has the formula:



wherein R^4 , R^5 , and R^6 are each independently selected from hydrogen, C_1 - C_3 alkyl, and mixtures thereof, provided that R^4 , R^5 , and R^6 are not all hydrogen and, when t is 0, at least R^4 or R^5 is not hydrogen; q, r, s, t are each independently integers from 0 to 13.

5. (original) The compound as claimed in Claim 4 wherein R has the formula:



wherein n, m, j and k are each independently integers from 0 to 13.

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6. (original) The compound as claimed in Claim 1 wherein R^2 is a hydrocarbon radical of the

formula:

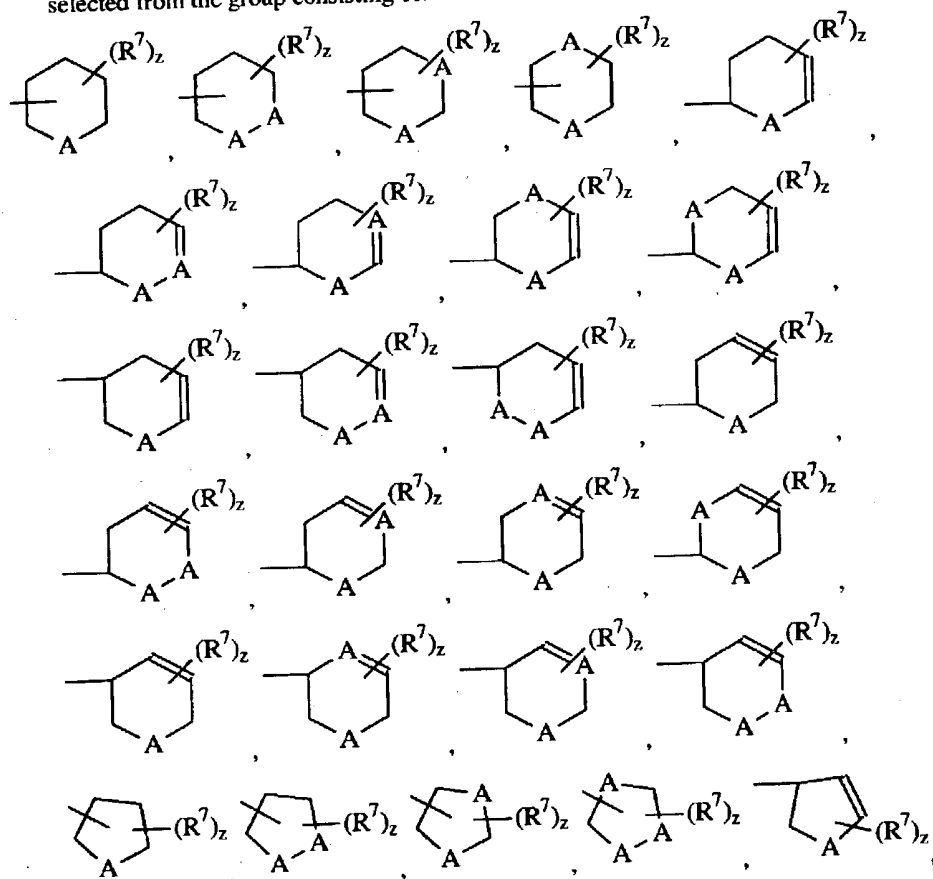


wherein R^3 is defined as above.

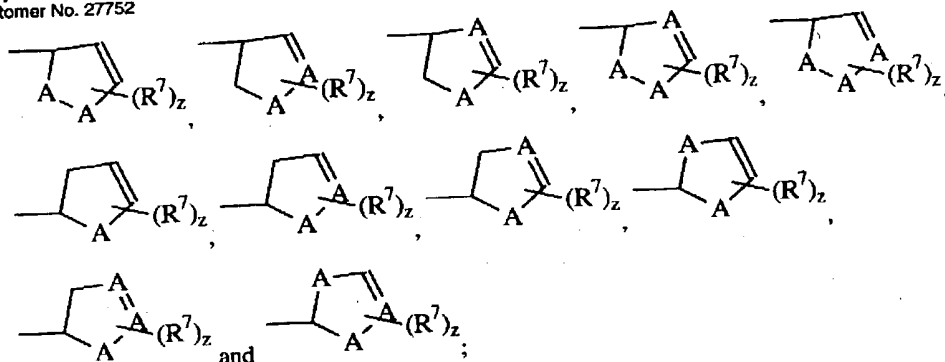
7. (original) The compound as claimed in Claim 6 wherein R^3 is CH_3CH_2 .

8. (previously presented) The compound as claimed in Claim 1 wherein R^2 is a 4 to 8 member substituted, or unsubstituted heterocyclic ring containing from 1 to 3 hetero atoms.

9. (previously presented) The compound as claimed in Claim 8 wherein said heterocycle is selected from the group consisting of:

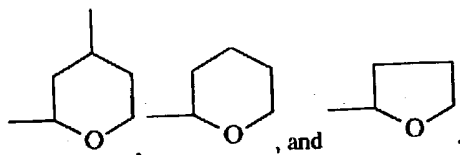


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wherein each R⁷ is independently selected from the group consisting of hydrogen, linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic hydrocarbon radical having from about 1 to about 10 carbon atoms, or R⁷ is a saturated or unsaturated, substituted or unsubstituted, alicyclic or aromatic hydrocarbon or alkoxy radical having, from about 1 to about 10 carbon atoms, which is fused to the heterocyclic ring; each A is independently selected from the group consisting of O, and N(R⁸)_a, wherein R⁸ is independently selected from the group consisting of hydrogen, linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic hydrocarbon radical having from about 1 to about 10 carbon atoms, and a is either 0 or 1; provided that any A that is bound by a double bond must be N(R⁸)_a wherein a = 0; z is an integer from 1 to 3.

10. (original) The compound as claimed in Claim 9 wherein said heterocycle is selected from the group consisting of:



11. (original) The compound as claimed in Claim 1 wherein R² is a 7 to 13 membered substituted, or unsubstituted polycyclic ring.

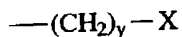
12. (previously presented) The compound as claimed in Claim 1 wherein R is selected from the group consisting of linear or branched, aliphatic hydrocarbon radicals having from about 7 to about 11 carbon atoms; R¹ is ethyl; x is a number from 6 to about 10; and R² is selected from the group consisting of a hydrocarbon radical of the formula:



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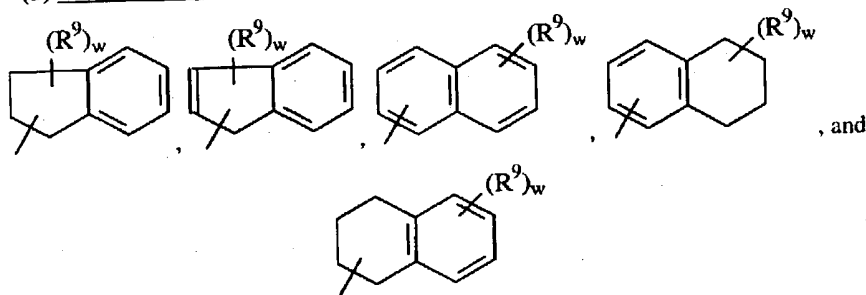
wherein R^3 is selected from the group consisting of linear or branched, aliphatic radicals having from about 3 to about 5 carbon atoms.

13. (currently amended) The compound as claimed in Claim 1 wherein R^2 is a hydrocarbon of the formula:



wherein, y is an integer from 1 to 7; and X is

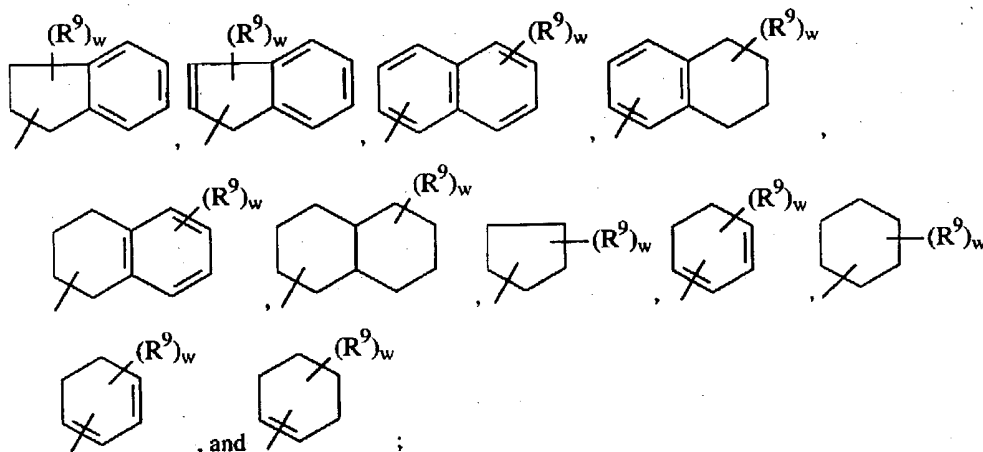
- (a) a 4 to 8 membered substituted, or unsubstituted, partially unsaturated cyclic hydrocarbon radical;
- (b) a 4, 5, 7 or 8 membered substituted or unsubstituted aromatic hydrocarbon radical;
- (c) a 6 membered aromatic hydrocarbon radical wherein R is a linear or branched saturated or unsaturated, C_9 to C_{20} aliphatic hydrocarbon radical;
- (d) an aromatic hydrocarbon selected from the group consisting of:



wherein each R^9 is independently selected from the group consisting of hydrogen, linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic hydrocarbon or alkoxy radical having from about 1 to about 10 carbon atoms, ~~a saturated or unsaturated, substituted or unsubstituted, alicyclic or aromatic hydrocarbon radical having, from about 3 to about 10 carbon atoms, which is fused to the ring;~~ w is an integer from 1 to 3.

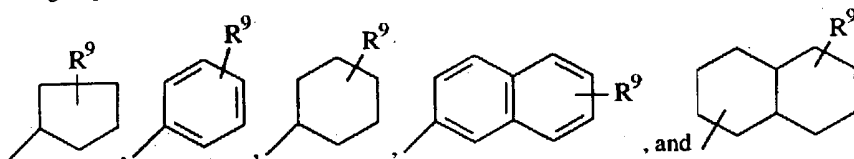
14. (currently amended) The compound as claimed in Claim 13 wherein X is selected from the group consisting of:

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wherein each R^9 is independently selected from the group consisting of hydrogen, linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic hydrocarbon or alkoxy radical having from about 1 to about 10 carbon atoms, ~~a saturated or unsaturated, substituted or unsubstituted, alicyclic or aromatic hydrocarbon radical having, from about 3 to about 10 carbon atoms, which is fused to the ring;~~ w is an integer from 1 to 3.

15. (previously presented) The compound as claimed in Claim 14 wherein X is selected from the group consisting of:



wherein R^9 is defined as above.

16. (currently amended) A process for preparing an ether-capped poly(oxyalkylated) alcohol having the formula:



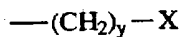
wherein, R is selected from the group consisting of linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic or aromatic hydrocarbon radicals having from about 1 to about 30 carbon atoms; R^1 may be the same or different, and is independently selected from the group consisting of branched or linear C_2 to C_7 alkylene in any given molecule; R^2 is selected from the group consisting of:

(a) a 4 to 8 membered substituted, or unsubstituted heterocyclic ring containing from 1 to 3 hetero atoms;

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(b) a 7 to 13 membered substituted, or unsubstituted polycyclic ring;

(c) a hydrocarbon of the formula:



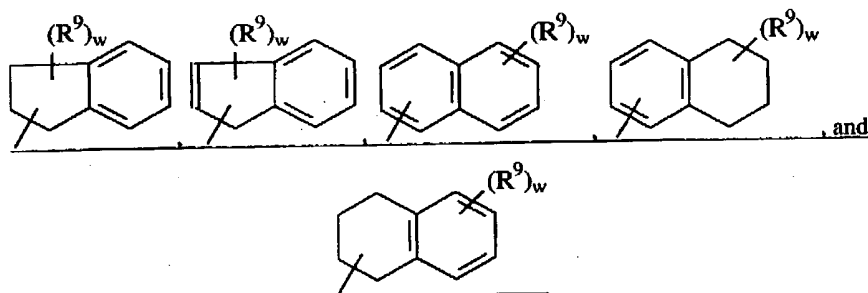
wherein, y is an integer from 1 to 7, X is selected from the group consisting of:

(A) a 4 to 8 membered substituted, or unsubstituted, partially unsaturated cyclic hydrocarbon radical;

(B) a 4, 5, 7 or 8 membered substituted or unsubstituted aromatic hydrocarbon radical;

(C) a 6 membered aromatic hydrocarbon radical wherein R is a linear or branched saturated or unsaturated, C₉ to C₂₀ aliphatic hydrocarbon radical;

(D) an aromatic hydrocarbon selected from the group consisting of:



wherein each R⁹ is independently selected from the group consisting of hydrogen, linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic hydrocarbon or alkoxy radical having from about 1 to about 10 carbon atoms.; w is an integer from 1 to 3; and

(d) a hydrocarbon radical of the formula:



wherein R³ is selected from the group consisting of:

(A) linear or branched, saturated or unsaturated, aliphatic hydrocarbon radical having from about 2 to about 30 carbon atoms;

(B) methyl, wherein R is branched saturated or unsaturated, aliphatic hydrocarbon radical having from 1 to 4 carbon atoms;

(C) a substituted or unsubstituted aromatic hydrocarbon radical having from about 15 to about 30 carbon atoms;

wherein x is a number from 1 to about 30;

(i) a 7 to 13 membered substituted, or unsubstituted polycyclic ring;

(ii) a hydrocarbon of the formula:

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wherein, y is an integer from 1 to 7, X is a 4 to 8 membered substituted, or unsubstituted, saturated or unsaturated cyclic or aromatic hydrocarbon radical; and
 (iii) a hydrocarbon radical of the formula:



wherein R^3 is selected from the group consisting of linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic or aromatic hydrocarbon radicals having from about 1 to about 30 carbon atoms, provided that when R^3 is methyl, R is branched;

wherein x is a number from 1 to about 30; comprising the steps of:

(a) providing an alcohol of the formula



wherein R^2 is as defined above;

(b) providing an alkoxyated alcohol of the formula



wherein R , R^1 , and x , are as defined above;

(c) reacting said alcohol with said alkoxyated alcohol in the presence of a catalyst to form said ether-capped poly(oxyalkylated) alcohol.

17. (canceled)

18. (original) The process as claimed in Claim 16 wherein said catalyst is selected from the group consisting of mineral acids, sulfonic acids and their salts.

19. (currently amended) The process as claimed in Claim 16 wherein said catalyst is selected from the group consisting of p-toluenesulfonic acid, methanesulfonic acid, polymeric catalysts, $TiCl_4$, $TiCl_2$, $Ti(O[[i]]Pr)_4$, $ZnCl_2$, $ZnCl_4$, $SnCl_4$, $AlCl_3$, $BF_3 \cdot OEt_2$, AMBERLYST®15, DOWEX 50X8-50, and mixtures thereof.

20. (original) The process as claimed in Claim 16 wherein said step of reacting of alcohol with alkoxyated alcohol is conducted in the presence of a solvent wherein said solvent is selected from the group consisting of benzene, toluene, dichloromethane, tetrahydrofuran, diethylether, methyl tert-butylether, and mixtures thereof.

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21. (original) The process as claimed in Claim 16 wherein said step of reacting alcohol with alkoxyated alcohol is conducted as a temperature of from about -20°C to about 300°C.

22. (original) The process as claimed in Claim 16 wherein said step of reacting alcohol with alkoxyated alcohol is conducted in the absence of a solvent.

23. (currently amended) A process for preparing an ether-capped poly(oxyalkylated) alcohol having the formula:

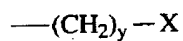


wherein, R, R¹, and x are as defined above; R² is selected from the group consisting of:

(a) a 4 to 8 membered substituted, or unsubstituted heterocyclic ring containing from
1 to 3 hetero atoms;

(b) a 7 to 13 membered substituted, or unsubstituted polycyclic ring;

(c) a hydrocarbon of the formula:



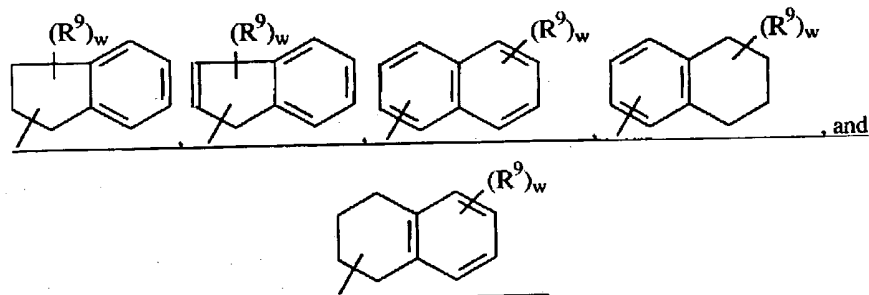
wherein, y is an integer from 1 to 7, X is selected from the group consisting of:

(A) a 4 to 8 membered substituted, or unsubstituted, partially unsaturated cyclic hydrocarbon radical;

(B) a 4, 5, 7 or 8 membered substituted or unsubstituted aromatic hydrocarbon radical;

(C) a 6 membered aromatic hydrocarbon radical wherein R is a linear or branched saturated or unsaturated, C₉ to C₂₀ aliphatic hydrocarbon radical;

(D) an aromatic hydrocarbon selected from the group consisting of:



wherein each R⁹ is independently selected from the group consisting of hydrogen, linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic hydrocarbon or alkoxy radical having from about 1 to about 10 carbon atoms.; w is an integer from 1 to 3; and

(d) a hydrocarbon radical of the formula:

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wherein R^3 is selected from the group consisting of:

(A) linear or branched, saturated or unsaturated, aliphatic hydrocarbon radical having from about 2 to about 30 carbon atoms;

(B) methyl, wherein R is branched saturated or unsaturated, aliphatic hydrocarbon radical having from 1 to 4 carbon atoms;

(C) a substituted or unsubstituted aromatic hydrocarbon radical having from about 15 to about 30 carbon atoms;

wherein x is a number from 1 to about 30;

(i) a 4 to 8 membered substituted, or unsubstituted heterocyclic ring containing from 1 to 3 hetero atoms;

(ii) a 7 to 13 membered substituted, or unsubstituted polycyclic ring;

(iii) a hydrocarbon of the formula:



wherein, y is an integer from 1 to 7, X is a 4 to 8 membered substituted, or unsubstituted, saturated or unsaturated cyclic or aromatic hydrocarbon radical; and

(iv) a hydrocarbon radical of the formula:



wherein R^3 is selected from the group consisting of linear or branched, saturated or unsaturated, substituted or unsubstituted, aliphatic or aromatic hydrocarbon radicals having from about 1 to about 30 carbon atoms, provided that when R^3 is methyl, R is branched;

wherein x is a number from 1 to about 30; comprising the steps of:

(a) providing an alpha-olefin

(b) providing an alkoxylated alcohol of the formula



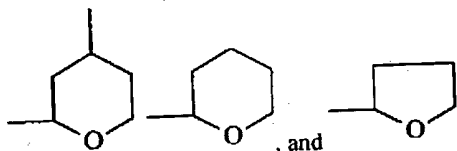
wherein R, R^1 , and x are as defined above;

(c) reacting said alkoxylated alcohol with said alpha-olefin to form said ether-capped poly(oxyalkylated) alcohol.

24. (original) The process as claimed in Claim 23 wherein R is a 4 to 8 member substituted, or unsubstituted heterocyclic ring containing from 1 to 3 hetero atoms.

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25. (original) The process as claimed in Claim 23 wherein said heterocycle is selected from the group consisting of:



25. (canceled)

26. (original) The process as claimed in Claim 23 wherein said step of reacting of alpha-olefin with alkoxyated alcohol is conducted in the presence of a catalyst.

27. (currently amended) The process as claimed in Claim 26 wherein said catalyst is selected from the group consisting of mineral acids, carboxylic acids, sulfonic acids, sulfinic acids, halogenated carboxylic acids, pyridinium *p*-toluenesulfonate, polymeric catalysts, TiCl_4 , $\text{Ti}(\text{O}(\text{i}]\text{Pr})_4$, ZnCl_2 , SnCl_4 , AlCl_3 , $\text{BF}_3\text{-OEt}_2$, ~~AMBERLYST@15~~ and mixtures thereof.

28. (original) The process as claimed in Claim 26 wherein said catalyst is selected from the group consisting of acetic acid, oxalic acid, glycolic acid, citric acid, tartaric acid, glycolic acid, maleic acid oxydisuccinic acid, trifluoroacetic acid, heptafluorobutyric acid, dichloroacetic acid, trichloroacetic acid, *p*-toluenesulfonic acid, *p*-toluenesulfinic acid, methanesulfonic acid, 4-bromobenzenesulfonic acid, naphthalenesulfonic acid, (+)-10-camphorsulfonic and isomers, alkylbenzenesulfonic acid, xylenesulfonic acid, cumenesulfonic acid and mixtures thereof.

29. (original) The process as claimed in Claim 23 wherein said step of reacting of alpha-olefin with alkoxyated alcohol is conducted in the presence of a solvent, wherein said solvent is selected from the group consisting of benzene, toluene, dichloromethane, tetrahydrofuran, diethylether, methyl tert-butylether, and mixtures thereof.

30. (original) The process as claimed in Claim 23 wherein said step of reacting alpha-olefin with alkoxyated alcohol is conducted as a temperature of from about -20°C to about 300°C .

31. (original) The process as claimed in Claim 23 wherein said step of reacting alpha-olefin with alkoxyated alcohol is conducted in the absence of a solvent.

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Claims 32-33 (canceled)

34. (previously presented) A detergent composition comprising an ether-capped poly(oxyalkylated) alcohol according to Claim 1.

35. (canceled)